

5.1 WATER QUALITY STANDARDS

The federal Clean Water Act defines “water quality standards” to include both “designated uses” (i.e., beneficial uses) and “water quality criteria” (i.e., water quality objectives). Thus, the designated beneficial uses and the water quality objectives listed below are the California water quality standards for waters of the Lake Tahoe Hydrologic Unit (HU).

Twenty-three beneficial uses and their definitions were developed by the State Board staff and recommended for use in the Regional Board Basin Plans. Three of those beneficial uses (Marine Habitat, Estuarine Habitat, and Shellfish Harvesting) are not found within the Region. Regional Board staff added two additional uses (Water Quality Enhancement, Flood Peak Attenuation/Flood Water Storage). Thus, the following nine beneficial use designations have been added since adoption of the 1975 Basin Plans: Industrial Process Supply, Fish Spawning, Fish Migration, Navigation, Commercial and Sport Fishing, Water Quality Enhancement, Preservation of Biological Habitats of Special Significance, Aquaculture, and Flood Peak Attenuation/Flood Water Storage. Specific wetland habitats and their associated beneficial uses has been added in recognition of the value of protecting wetlands. This Chapter contains two tables (Tables 5.1-1 and 5.1-2) designating the beneficial uses of surface waters and ground waters in the Lake Tahoe HU.

Definitions of Beneficial Uses

AGR Agricultural Supply. Beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.

AQUA Aquaculture. Beneficial uses of waters used for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, and harvesting of aquatic plants and animals for human consumption or bait purposes.

BIOL Preservation of Biological Habitats of Special Significance. Beneficial uses of

waters that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, and Areas of Special Biological Significance (ASBS), where the preservation and enhancement of natural resources requires special protection.

COLD Cold Freshwater Habitat. Beneficial uses of waters that support cold water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

COMM Commercial and Sportfishing. Beneficial uses of waters used for commercial or recreational collection of fish or other organisms including, but not limited to, uses involving organisms intended for human consumption.

FLD Flood Peak Attenuation/Flood Water Storage. Beneficial uses of riparian wetlands in flood plain areas and other wetlands that receive natural surface drainage and buffer its passage to receiving waters.

FRSH Freshwater Replenishment. Beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).

GWR Ground Water Recharge. Beneficial uses of waters used for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.

IND Industrial Service Supply. Beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

MIGR Migration of Aquatic Organisms. Beneficial uses of waters that support habitats necessary for migration, acclimatization between fresh and salt water, or temporary activities by aquatic organisms, such as anadromous fish.

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- MUN Municipal and Domestic Supply.** Beneficial uses of waters used for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- NAV Navigation.** Beneficial uses of waters used for shipping, travel, or other transportation by private, military, or commercial vessels.
- POW Hydropower Generation.** Beneficial uses of waters used for hydroelectric power generation.
- PRO Industrial Process Supply.** Beneficial uses of waters used for industrial activities that depend primarily on water quality.
- RARE Rare, Threatened, or Endangered Species.** Beneficial uses of waters that support habitat necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened or endangered.
- REC-1 Water Contact Recreation.** Beneficial uses of waters used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, and use of natural hot springs.
- REC-2 Non-contact Water Recreation.** Beneficial uses of waters used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.
- SAL Inland Saline Water Habitat.** Beneficial uses of waters that support inland saline water ecosystems including, but not limited to, preservation and enhancement of aquatic saline habitats, vegetation, fish, and wildlife,

including invertebrates.

- SPWN Spawning, Reproduction, and Development.** Beneficial uses of waters that support high quality aquatic habitat necessary for reproduction and early development of fish and wildlife.

- WARM Warm Freshwater Habitat.** Beneficial uses of waters that support warm water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

- WILD Wildlife Habitat.** Beneficial uses of waters that support wildlife habitats including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

- WQE Water Quality Enhancement.** Beneficial uses of waters that support natural enhancement or improvement of water quality in or downstream of a water body including, but not limited to, erosion control, filtration and purification of naturally occurring water pollutants, streambank stabilization, maintenance of channel integrity, and siltation control.

Historical Beneficial Uses

The 1975 Basin Plans included brief discussions of the history of human water use in the Lahontan Region, and tables of "historical" beneficial use designations from earlier interstate water policies and "interim" final Basin Plans. Earlier beneficial use designations were primarily on a watershed basis; the 1975 Plans designated uses for specific water bodies. Copies of historical information from the 1975 Plans may be obtained by contacting Regional Board staff. The 1975 beneficial use designations were based on knowledge of the existing and potential water uses, with emphasis on the former. For example, many high quality surface waters of the North Lahontan Basin were not designated for municipal use because water supplies in these areas were taken from ground water sources. Historical beneficial uses have been incorporated into Tables 5.1-1 and 5.1-2 as potential uses (a use which once

existed could potentially exist again).

No beneficial use designations adopted in the 1975 Basin Plans have been removed from waters of the Lake Tahoe HU. Removal of a use designation requires a "Use Attainability Analysis," using U.S. Environmental Protection Agency methodology, to show that the use does not occur and cannot reasonably be attained.

Present and Potential Beneficial Uses

In the Basin Planning process, a number of beneficial uses are usually identified for a given body of water. Water quality objectives are established (see below) which are sufficiently stringent to protect the most sensitive use. The Regional Board reserves the right to resolve any conflicts among beneficial uses, based on the facts in a given case. It should be noted that the assimilation of wastes is **not** a beneficial use.

In the tables of beneficial uses (Tables 5.1-1 and 5.1-2), an "X" indicates an existing or potential use. Many of the existing uses are documented by biological data or human use statistics; some are not. Lakes and streams may have potential beneficial uses established because: (1) plans already exist to put the water to those uses, (2) conditions (location, demand) make such future use likely, (3) the water has been identified as a potential source of drinking water based on the quality and quantity available (see Sources of Drinking Water Policy, in Appendix B), and/or (4) existing water quality does not support these uses, but remedial measures may lead to attainment in the future. The establishment of a potential beneficial use can have different purposes such as: (1) establishing a water quality goal which must be achieved through control actions in order to re-establish a beneficial use as in No. 4, above, or (2) serving to protect the existing quality of a water source for eventual use.

The water body listings in Tables 5.1-1 and 5.1-2 name all significant surface waters and ground water basins. Maps of the hydrologic units and the ground water basins are included as part of this Basin Plan (see Plates 1A and 2A). Hydrologic units and ground water basins are listed from north to south. Unit and basin numbers are provided in the tables for reference to the Department of Water Resources

standardized maps. Unless otherwise specified, beneficial uses also apply to all tributaries of surface waters identified in Table 5.1-1 (i.e., specific surface waters which are not listed have the same beneficial uses as the streams, lakes, wetlands, or reservoirs to which they are tributary). Note that nondegradation objectives (see below) would supersede other objectives in instances where the tributary is of higher quality than its receiving water. Other minor surface waters, including wetlands, springs, streams, lakes, and ponds, are included under one heading for each hydrologic unit. These minor surface waters have an "X" to designate each potential or existing beneficial use. Also, ground waters which are not a part of the named basins are recognized as potential or existing "municipal and domestic water supply" (MUN). The beneficial uses for ground water which are contained in Table 5.1-2 are for each ground water basin or sub-basin as an entirety. Some ground water basins contain multiple aquifers or a single aquifer with varying water quality which may support different beneficial uses. Therefore, the placing of an "X" in Table 5.1-2 does not indicate that all of the ground waters in that particular location are suitable (without treatment) for a designated beneficial use. However, all waters are designated as MUN unless they have been specifically exempted by the Regional Board through adoption of a Basin Plan amendment after consideration of substantial evidence to exempt such waters (see Sources of Drinking Water Policy in Appendix B). Also, certain surface waters, including internal drainage lakes, may have varying water quality from changes in natural conditions (e.g., change in water volume). The designation of multiple beneficial uses in Table 5.1-1, which may appear conflicting for a particular surface water, indicates existing or probable future beneficial uses that may occur only temporarily.

In most cases, removing a beneficial use designation from Table 5.1-1 will require a Use Attainability Analysis (UAA) to be conducted (using USEPA methodology). If there is substantial evidence to remove a use designation from a specific water body, the Regional Board will consider adoption of a Basin Plan amendment to remove a designated beneficial use. However, there are many beneficial uses which are not intended to apply to the entire length of a stream or to a surface water during certain temporal conditions (see above). The beneficial use designations that may be considered for temporary or site specific designation include: IND, PRO, GWR,

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FRSH, NAV, POW, COLD, MIGR, SPWN, and WQE. For these situations, Regional Board staff, in order to make a recommendation to the Regional Board, will rely on site-specific documentation which may include: water quality data, field data, professional opinions (from Regional Board staff or other state and federal agencies, also universities), and other evidence collected by a discharger. The most sensitive existing or probable future use will be protected. Uses that did not exist, do not exist and will not exist in the foreseeable future, will not be required to be protected. The MUN designation will not be considered for a site-specific designation since it is designated for all waters, unless specifically exempted by the Regional Board in accordance with the State Board's Sources of Drinking Water Policy.

Water Quality Objectives

The Porter-Cologne Water Quality Control Act defines "water quality objectives" as the allowable "limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." Thus, water quality objectives are intended to protect the public health and welfare, and to maintain or enhance water quality in relation to the existing and/or potential beneficial uses of the water. The objectives, when compared to future water quality data, will also provide the basis for detecting any future trend toward degradation or enhancement of basin waters.

Water quality objectives apply to "waters of the State" and "waters of the United States." Some of the waters of the Lahontan Region are interstate waters, flowing into either Nevada or Oregon. The Lahontan Regional Board has a responsibility to ensure that waters leaving the state meet the water quality standards of the receiving state (see the discussion of "Interstate Issues" in the Introduction to Chapter 4).

Water Quality Objectives and Effluent Limits

It is important to recognize the distinction between ambient water quality objectives and "effluent limitations" or "discharge standards" which are conditions in state and federal waste discharge

permits. Effluent limitations are established in permits both to protect water for beneficial uses within the area of the discharge, and to meet or achieve water quality objectives. Stormwater effluent limitations for the Lake Tahoe HU are discussed in Section 5.6.

Methodology For Establishing Water Quality Objectives

Water quality objectives are numerical or narrative. Narrative and numerical water quality objectives define the upper concentration or other limits that the Regional Board considers protective of beneficial uses.

The general methodology used in establishing water quality objectives involves, first, designating beneficial water uses; and second, selecting and quantifying the water quality parameters necessary to protect the most vulnerable (sensitive) beneficial uses. To comply with the Nondegradation Objective (see below), water quality objectives may be established at levels better than that necessary to protect the most vulnerable beneficial use.

In establishing water quality objectives, factors in addition to designated beneficial uses and the Nondegradation Objective are considered. These factors include environmental and economic considerations specific to each hydrologic unit, the need to develop and use recycled water, as well as the level of water quality which could be achieved through coordinated control of all factors which affect water quality in an area. Controllable water quality factors are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the State, and that may be reasonably controlled.

Water quality objectives can be reviewed and, if appropriate, revised by the Lahontan Regional Board. Revised water quality objectives would then be adopted as part of this Basin Plan by amendment. Opportunities for formal public review of water quality objectives will be available at a minimum of once every three years following the adoption of this Basin Plan to determine the need for further review and revision.

Establishment of Numerical Objectives for Specific Water Bodies

Where available data were sufficient to define

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existing ambient levels of constituents, these levels were used in developing the numerical objectives for specific water bodies. By utilizing annual mean, 90th percentile values and flow-weighted values, the objectives are intended to be realistic within the variable conditions imposed by nature. This approach provides an opportunity to detect changes in water quality as a function of time through comparison of annual means, while still accommodating variations in the measured constituents.

Objectives for specific water bodies generally reflect either historical (often pre-1975) water quality, or the levels of constituents needed to protect the most sensitive beneficial use. The waters of the Lake Tahoe Basin are generally of very high quality; however, in a few water bodies, State water quality objectives may be exceeded due to natural causes. For example, some wells in South Lake Tahoe have concentrations of uranium exceeding the drinking water maximum contaminant level. The Regional Board recognizes that such violations may occur, and will assess compliance with the objectives on a case-by-case basis.

Most of the numerical water quality objectives for Lake Tahoe and its tributaries, and the narrative objectives for clarity and productivity, are based on historical high quality. In 1980, the State Board revised the numerical objectives set for Lake Tahoe and its tributaries in the 1975 North Lahontan Basin Plan, with some modifications clarifying the standards for Lake Tahoe and revising the standards for tributary streams. The clarity and productivity objectives were based on monitoring data from the late 1960s and early 1970s and were set to stabilize the quality of Lake Tahoe at levels recorded in those years. The revised water quality objectives for tributary streams were based on data collected during TRPA's Section 208 planning effort in the 1970s for streams classified as draining disturbed or undisturbed watersheds. Weighted mean concentrations were determined for total nitrogen, total phosphorus, and iron for each tributary stream. For a stream draining an undisturbed watershed, the water quality objectives for these three parameters in Table 5.1-3 represent the weighted mean concentrations determined for that specific stream. For streams draining disturbed watersheds, the objectives in Table 5.1-3 are based on the overall mean nutrient concentration for all streams draining undisturbed watersheds.

Numerical objectives have not yet been established for all streams tributary to Lake Tahoe in California. TRPA has requested that the Regional Board review and consider revising existing objectives for iron, since recent monitoring data show violations of objectives in some presumably undisturbed water bodies. Although more intensive stream monitoring has been performed since 1980, most of the information collected reflects drought conditions, and it does not provide a good basis for setting or revising objectives. Regional Board staff propose to review and consider further revision of objectives for tributaries of Lake Tahoe as part of the next Triennial Review process, assuming that better information will be available.

Achieving water quality objectives for tributary streams will also help to protect Lake Tahoe. Tributary objectives are in addition to, not a substitute for the standards for Lake Tahoe. Despite attainment of the standards for a stream, further reductions in the nutrient concentrations in the stream may be required so that the total nutrient load from all streams is reduced enough to prevent deterioration of Lake Tahoe.

Prohibited Discharges

Discharges which cause violation of the Nondegradation Objective (see below), or any narrative or numerical water quality objective are prohibited. (See also Section 5.2, "Waste Discharge Prohibitions.")

After application of reasonable control measures, ambient water quality shall conform to the narrative and numerical water quality objectives included in this Basin Plan. When other factors result in the degradation of water quality beyond the limits established by these water quality objectives, controllable human activities shall not cause further degradation of water quality in either surface or ground waters.

Compliance with Water Quality Objectives

The purpose of text, in italics, following certain water quality objectives is to provide specific direction on compliance with the objective. General direction on compliance with objectives is described in the last section of this Chapter. It is not feasible to cover all

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circumstances and conditions which could be created by all discharges. Therefore, it is within the discretion of the Regional Board to establish other, or additional, direction on compliance with objectives of this Basin Plan. The purpose of the italic text is to provide direction only, and **not** to specify method of compliance.

Nondegradation Objective

This objective applies to **all** waters of the Lahontan Region (including surface waters, wetlands, and ground waters.)

On October 28, 1968, the State Water Resources Control Board adopted Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," establishing a nondegradation policy for the protection of water quality. This policy, referred to in this Basin Plan as the Nondegradation Objective, requires continued maintenance of existing high quality waters. Whenever the existing quality of water is better than the quality of water established in this Basin Plan as objectives (both narrative and numerical), such existing quality shall be maintained unless appropriate findings are made under the policy. The U.S. Environmental Protection Agency, Region IX, has also issued detailed guidelines for implementation of federal antidegradation regulations for surface waters (40 CFR § 131.12). For more information, see the discussion on "General Direction Regarding Compliance With Objectives" at the end of this Chapter.

The State Board designated Lake Tahoe an Outstanding National Resource Water (ONRW) in 1980, both for its recreational and its ecological value, and stated:

"Viewed from the standpoint of protecting beneficial uses, preventing deterioration of Lake Tahoe requires that there be no significant increase in algal growth rates. Lake Tahoe's exceptional recreational value depends on enjoyment of the scenic beauty imparted by its clear, blue waters. ...Likewise, preserving Lake Tahoe's ecological value depends on maintaining the extraordinarily low rates of algal growth which make Lake Tahoe an outstanding ecological resource."

Section 114 of the federal Clean Water Act also indicates the need to "preserve the fragile ecology of Lake Tahoe."

Water Quality Objectives for Surface Waters

(See Tables 5.1-3 through 5.1-6)

Unless otherwise specified, the following objectives (listed alphabetically) apply to all surface waters of the Lahontan Region, including the Lake Tahoe HU (see Figures 5-3 and 5-4):

Ammonia

The neutral, unionized ammonia species (NH_3°) is highly toxic to freshwater fish. The fraction of toxic NH_3° to total ammonia species ($\text{NH}_4^+ + \text{NH}_3^\circ$) is a function of temperature and pH. Tables 5.1-5 and 5.1-6 were derived from USEPA ammonia criteria for freshwater. Ammonia concentrations shall not exceed the values listed for the corresponding conditions in these tables. For temperature and pH values not explicitly in these tables, the most conservative value neighboring the actual value may be used or criteria can be calculated from numerical formulas developed by the USEPA. For one-hour (1h-NH_3) and four-day (4d-NH_3) unionized ammonia criteria, the following equations apply:

$$1\text{h-NH}_3 = 0.052 \div (\text{FT} \times \text{FPH} \times 2)$$

$$4\text{d-NH}_3 = 0.80 \div (\text{FT} \times \text{FPH} \times \text{RATIO})$$

where:

$$\text{FT} = 10^{[0.03(20-\text{TCAP})]}$$

for: $\text{TCAP} \leq T \leq 30$

$$\text{FT} = 10^{[0.03(20-T)]}$$

for: $0 \leq T \leq \text{TCAP}$

$$\text{FPH} = (1 + 10^{(7.4-\text{pH})}) \div 1.25$$

for: $6.5 \leq \text{pH} \leq 8.0$

$$\text{FPH} = 1$$

for: $8.0 \leq \text{pH} \leq 9.0$

$$\text{RATIO} = 20.25 \times (10^{(7.7-\text{pH})}) \div (1 + 10^{(7.4-\text{pH})})$$

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for: $6.5 \leq \text{pH} \leq 7.7$

RATIO = 13.5

for: $7.7 \leq \text{pH} \leq 9.0$

and:

T = temperature in °C

TCAP = temperature cap in °C

For 1h-NH₃, TCAP is 20°C with salmonids present and 25°C with salmonids absent. For 4d-NH₃, TCAP is 15°C with salmonids present and 20°C with salmonids absent.

For interpolation of total ammonia (NH₄⁺ + NH₃^o) criteria, the following equations can be used:

$$n_{1h} = 1h\text{-NH}_3 \div f, \text{ or } n_{4d} = 4d\text{-NH}_3 \div f$$

where:

n_{1h} is the one-hour criteria for total ammonia species (NH₄⁺ + NH₃^o)

n_{4d} is the four-day criteria for total ammonia species (NH₄⁺ + NH₃^o)

$$f = 1 \div (10^{(\text{pKa}-\text{pH})} + 1)$$

$$\text{pKa} = 0.0901821 + [2729.92 \div (T + 273.15)]$$

and:

pKa is the negative log of the equilibrium constant for the NH₄⁺ → NH₃^o + H⁺ reaction

f is the fraction of unionized ammonia to total ammonia species: $[\text{NH}_3^o \div (\text{NH}_4^+ + \text{NH}_3^o)]$

Values outside of the ranges 0-30°C or pH 6.5-9.0 cannot be extrapolated from these relationships. Site-specific objectives must be developed for these conditions. A microcomputer spreadsheet to calculate ammonia criteria was developed by Regional Board staff. An example of output from this program is given in Table 5.1- 7. Contact the Regional Board if a copy is desired.

Bacteria, Coliform

Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.

The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml. *The log mean shall ideally be based on a minimum of not less than five samples collected as evenly spaced as practicable during any 30-day period. However, a log mean concentration exceeding 20/100 ml for any 30-day period shall indicate violation of this objective even if fewer than five samples were collected.*

Biostimulatory Substances

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect the water for beneficial uses.

Chemical Constituents

Waters designated as MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in the following provisions of Title 22 of the California Code of Regulations which are incorporated by reference into this plan: Table 64431-A of Section 64431 (Inorganic Chemicals), Table 64431-B of Section 64431 (Fluoride), Table 64444-A of Section 64444 (Organic Chemicals), Table 64449-A of Section 64449 (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits), and Table 64449-B of Section 64449 (Secondary Maximum Contaminant Levels-Ranges). This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

Waters designated as AGR shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses (i.e., agricultural purposes).

Waters shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses.

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Chlorine, Total Residual

For the protection of aquatic life, total chlorine residual shall not exceed either a median value of 0.002 mg/L or a maximum value of 0.003 mg/L. Median values shall be based on daily measurements taken within any six-month period.

Color

Waters shall be free of coloration that causes nuisance or adversely affects the water for beneficial uses.

Dissolved Oxygen

The dissolved oxygen concentration, as percent saturation, shall not be depressed by more than 10 percent, nor shall the minimum dissolved oxygen concentration be less than 80 percent of saturation.

For waters with the beneficial uses of COLD, COLD with SPWN, WARM, and WARM with SPWN, the minimum dissolved oxygen concentration shall not be less than that specified in Table 5.1-8.

Floating Materials

Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect the water for beneficial uses.

For natural high quality waters, the concentrations of floating material shall not be altered to the extent that such alterations are discernable at the 10 percent significance level.

Oil and Grease

Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect the water for beneficial uses.

For natural high quality waters, the concentration of oils, greases, or other film or coat generating substances shall not be altered.

Nondegradation of Aquatic Communities and Populations

All wetlands shall be free from substances attributable to wastewater or other discharges that produce adverse physiological responses in humans, animals, or plants; or which lead to the presence of undesirable or nuisance aquatic life.

All wetlands shall be free from activities that would substantially impair the biological community as it naturally occurs due to physical, chemical and hydrologic processes.

Pesticides

For the purposes of this Basin Plan, pesticides are defined to include insecticides, herbicides, rodenticides, fungicides, piscicides and all other economic poisons. An economic poison is any substance intended to prevent, repel, destroy, or mitigate the damage from insects, rodents, predatory animals, bacteria, fungi or weeds capable of infesting or harming vegetation, humans, or animals (CA Agriculture Code § 12753).

Pesticide concentrations, individually or collectively, shall not exceed the lowest detectable levels, using the most recent detection procedures available. There shall not be an increase in pesticide concentrations found in bottom sediments. There shall be no detectable increase in bioaccumulation of pesticides in aquatic life.

Waters designated as MUN shall not contain concentrations of pesticides or herbicides in excess of the limiting concentrations specified in Table 64444-A of Section 64444 (Organic Chemicals) of Title 22 of the California Code of Regulations which is incorporated by reference into this plan. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

pH

In fresh waters with designated beneficial uses of COLD, changes in normal ambient pH levels shall not exceed 0.5 pH units. For all other waters, the pH shall not be depressed below 6.5 nor raised above 8.5.

The Regional Board recognizes that some waters of the Region may have natural pH levels outside of the 6.5 to 8.5 range. Compliance with the pH objective for these waters will be determined on a case-by-case basis.

Radioactivity

Radionuclides shall not be present in concentrations which are deleterious to human, plant, animal, or aquatic life nor which result in the accumulation of

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radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life.

Waters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations which is incorporated by reference into this plan. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

Sediment

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.

Settleable Materials

Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. For natural high quality waters, the concentration of settleable materials shall not be raised by more than 0.1 milliliter per liter.

Suspended Materials

Waters shall not contain suspended materials in concentrations that cause nuisance or that adversely affects the water for beneficial uses.

For natural high quality waters, the concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10 percent significance level.

Taste and Odor

Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish or other edible products of aquatic origin, that cause nuisance, or that adversely affect the water for beneficial uses. For naturally high quality waters, the taste and odor shall not be altered.

Temperature

The natural receiving water temperature of all waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such an alteration in temperature does not adversely affect the water for beneficial uses.

For waters designated COLD, the temperature shall not be altered.

Temperature objectives for COLD interstate waters and WARM interstate waters are as specified in the "Water Quality Control Plan for Control of Temperature in The Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" including any revisions. This plan is summarized in Chapter 6 (Plans and Policies) and included in Appendix B.

Toxicity

All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. *Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration and/or other appropriate methods as specified by the Regional Board.*

The survival of aquatic life in surface waters subjected to a waste discharge, or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or when necessary, for other control water that is consistent with the requirements for "experimental water" as defined in *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association, et al. 1992).

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10 percent.

Water Quality Objectives for Certain Water Bodies (Figure 5.1-1)

The following objectives (listed alphabetically) are in addition to the regionwide objectives specified above. These objectives apply to certain surface waters of the Lake Tahoe Hydrologic Unit (HU). Tables 5.1-3 and 5.1-4 also contain additional water quality objectives for certain water bodies within the Lake Tahoe HU.

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Algal Growth Potential

For Lake Tahoe, the mean algal growth potential at any point in the Lake shall not be greater than twice the mean annual algal growth potential at the limnetic reference station. *The limnetic reference station is located in the north central portion of Lake Tahoe. It is shown on maps in annual reports of the Lake Tahoe Interagency Monitoring Program. Exact coordinates can be obtained from the U.C. Davis Tahoe Research Group.*

Biological Indicators

For Lake Tahoe, algal productivity and the biomass of phytoplankton, zooplankton, and periphyton shall not be increased beyond the levels recorded in 1967-71, based on statistical comparison of seasonal and annual means. *The "1967-71 levels" are reported in the annual summary reports of the "California-Nevada-Federal Joint Water Quality Investigation of Lake Tahoe" published by the California Department of Water Resources.*

Clarity

For Lake Tahoe, the vertical extinction coefficient shall be less than 0.08 per meter when measured below the first meter. When water is too shallow to determine a reliable extinction coefficient, the turbidity shall not exceed 3 Nephelometric Turbidity Units (NTU). In addition, turbidity shall not exceed 1 NTU in shallow waters not directly influenced by stream discharges. *The Regional Board will determine when water is too shallow to determine a reliable vertical extinction coefficient based upon its review of standard limnological methods and on advice from the U.C. Davis Tahoe Research Group.*

Conductivity, Electrical

In Lake Tahoe, the mean annual electrical conductivity shall not exceed 95 umhos/cm at 50°C at any location in the Lake.

pH

In Lake Tahoe, the pH shall not be depressed below 7.0 nor raised above 8.4.

Plankton Counts

For Lake Tahoe, the mean seasonal concentration of plankton organisms shall not be greater than 100 per ml and the maximum concentration shall not be greater than 500 per ml at any point in the Lake.

Suspended Sediment

Suspended sediment concentrations in streams tributary to Lake Tahoe shall not exceed a 90th percentile value of 60 mg/L. (This objective is equivalent to the Tahoe Regional Planning Agency's regional "environmental threshold carrying capacity" standard for suspended sediment in tributaries.) *The Regional Board will consider revision of this objective in the future if it proves not to be protective of beneficial uses or if review of monitoring data indicates that other numbers would be more appropriate for some or all streams tributary to Lake Tahoe.*

Transparency

For Lake Tahoe, the secchi disk transparency shall not be decreased below the levels recorded in 1967-71, based on a statistical comparison of seasonal and annual mean values. *The "1967-71 levels" are reported in the annual summary reports of the "California-Nevada-Federal Joint Water Quality Investigation of Lake Tahoe" published by the California Department of Water Resources.*

Water Quality Objectives for Fisheries Management Activities Using the Fish Toxicant Rotenone

Rotenone is a fish toxicant used by the California Department of Fish and Game (DFG) for fishery management purposes. (See Chapter 4 for a more complete discussion of this topic.)

The application of rotenone solutions and the detoxification agent potassium permanganate can cause several water quality objectives to be temporarily exceeded, both inside and outside of project boundaries. (Project boundaries are defined as encompassing the treatment area, the detoxification area, and the area downstream of the detoxification station up to a thirty-minute travel time.)

Additional narrative water quality objectives applicable to rotenone treatments are: color, pesticides, toxicity, and species composition. Conditional variances to these objectives may be granted by the Regional Board's Executive Officer for rotenone applications by the DFG, provided that such projects comply with the conditions described below and with the conditions described in Chapter 4 (Implementation) under the section entitled

5.1, Water Quality Standards

“Rotenone Use in Fisheries Management.”

Color

The characteristic purple discoloration resulting from the discharge of potassium permanganate shall not be discernible more than two miles downstream of project boundaries at any time. Twenty-four (24) hours after shutdown of the detoxification operation, no color alteration(s) resulting from the discharge of potassium permanganate shall be discernible within or downstream of project boundaries.

Pesticides

Chemical residues resulting from rotenone treatment must not exceed the following limitations:

1. The concentration of naphthalene outside of project boundaries shall not exceed 25 ug/liter (ppb) at any time.
2. The concentration of rotenone, rotenolone, trichloroethylene (TCE), xylene, or acetone (or potential trace contaminants such as benzene or ethylbenzene) outside of project boundaries shall not exceed the detection levels for these respective compounds at any time. “Detection level” is defined as the minimum level that can be reasonably detected using state-of-the-art equipment and methodology.
3. After a two-week period has elapsed from the date that rotenone application was completed, no chemical residues resulting from the treatment shall be present at detectable levels within or downstream of project boundaries.
4. No chemical residues resulting from rotenone treatments shall exceed detection levels in ground water at any time.

Species Composition

The reduction in fish diversity associated with the elimination of non-native game fish or exotic species may be part of the project goal, and may therefore be unavoidable. However, non-target aquatic populations (e.g., invertebrates, amphibians) that are reduced by rotenone treatments are expected to repopulate project areas within one year. Where species composition objectives are established for specific water bodies or hydrologic units, the established objective(s) shall be met for all non-target aquatic organisms within one year following rotenone

treatment. For multi-year treatments (i.e., when rotenone is applied to the same water body during two or more consecutive years), the established objective(s) shall be met for all non-target aquatic organisms within one year following the final rotenone application to a given water body.

Threatened or endangered aquatic populations (e.g., invertebrates, amphibians) shall not be adversely affected. The DFG shall conduct pre-project monitoring to prevent rotenone application where threatened or endangered species may be adversely impacted.

Toxicity

Chemical residues resulting from rotenone treatment must not exceed the limitations listed above for pesticides.

Water Quality Objectives Which Apply to All Ground Waters

Bacteria, Coliform

In ground waters designated as MUN, the median concentration of coliform organisms over any seven-day period shall be less than 1.1/100 milliliters.

Chemical Constituents

Ground waters designated as MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in the following provisions of Title 22 of the California Code of Regulations which are incorporated by reference into this plan: Table 64431-A of Section 64431 (Inorganic Chemicals), Table 64431-B of Section 64431 (Fluoride), Table 64444-A of Section 64444 (Organic Chemicals), Table 64449-A of Section 64449 (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits), and Table 64449-B of Section 64449 (Secondary Maximum Contaminant Levels-Ranges). This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

Waters designated as AGR shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses (i.e., agricultural purposes).

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Ground waters shall not contain concentrations of chemical constituents that adversely affect the water for beneficial uses.

Radioactivity

Ground waters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations which is incorporated by reference into this plan. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

Taste and Odor

Ground waters shall not contain taste or odor-producing substances in concentrations that cause nuisance or that adversely affect beneficial uses. For ground waters designated as MUN, at a minimum, concentrations shall not exceed adopted secondary maximum contaminant levels specified in Table 64449-A of Section 64449 (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits), and Table 64449-B of Section 64449 (Secondary Maximum Contaminant Levels-Ranges) of Title 22 of the California Code of Regulations which is incorporated by reference into this plan. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

General Direction Regarding Compliance With Objectives

This section includes general direction on determining compliance with the nondegradation, narrative and numerical objectives described in this Chapter. (Specific direction on compliance with certain objectives is included, in italics, following the text of the objective.) It is not feasible to cover all circumstances and conditions which could be created by all discharges. Therefore, it is within the discretion of the Regional Board to establish other, or additional, direction on compliance with objectives of this Plan. Where more than one objective is applicable, the **stricter objective shall apply**. (The only exception is where a regionwide objective has been superseded by the adoption of a site-specific objective by the Regional Board.) Where objectives are not specifically designated, downstream

objectives apply to upstream tributaries.

Nondegradation Objective

To implement State Board Resolution No. 68-16, the "Statement of Policy with Respect to Maintaining High Quality Waters in California," the Regional Board follows guidance such as that in the USEPA's 1993 *Water Quality Standards Handbook* and the State Board's October 7, 1987 legal memorandum titled "Federal Antidegradation Policy" (Attwater 1987). The State Board has interpreted the Resolution No. 68-16 to incorporate the federal antidegradation policy in order to ensure consistency with federal Clean Water Act requirements (see State Board Order No. WQ 86-17, pages 16-24). For detailed information on the federal antidegradation policy, see USEPA Region IX's *Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12* and USEPA's *Questions and Answers on Antidegradation*. The Regional Board's procedures for implementation of State and federal antidegradation policies are summarized below. It is important to note that the federal policy applies only to surface waters, while the State policy applies to both surface and ground waters.

Under the State Nondegradation Objective, whenever the existing quality of water is better than that needed to protect all existing and probable future beneficial uses, the existing high quality shall be maintained until or unless it has been demonstrated to the State that any change in water quality will be consistent with the maximum benefit of the people of the State, and will not unreasonably affect present and probable future beneficial uses of such water. Therefore, unless these conditions are met, background water quality concentrations (the concentrations of substances in natural waters which are unaffected by waste management practices or contamination incidents) are appropriate water quality goals to be maintained. If it is determined that some degradation is in the best interest of the people of California, some increase in pollutant level may be appropriate. However, in no case may such increases cause adverse impacts to existing or probable future beneficial uses of waters of the State.

Where the federal antidegradation policy applies, it does not absolutely prohibit any changes in water quality. The policy requires that any reductions in water quality be consistent with the three-part test

established by the policy, as described below.

Part One—Instream Uses

[40 CFR § 131.12(a)(1)]

The first part of the test establishes that “existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.” Reductions in water quality should not be permitted if the change in water quality would seriously harm any species found in the water (other than an aberrational species). Waters of this type are generally referred to as “Tier I” waters.

Part Two—Public Interest Balancing

[40 CFR § 131.12(a)(2)]

The second part of the test applies where water quality is higher than necessary to protect existing instream beneficial uses. This part of the test allows reductions in water quality if the state finds “that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located” **and** existing beneficial uses are protected. Waters of this type are generally referred to as “Tier II” waters.

Part Three—Outstanding National Resource

Waters (ONRWs) [40 CFR § 131.12(a)(3)]

The third part of the test established by the federal policy requires that the water quality of the waters which constitute an outstanding national resource be maintained and protected. No permanent or long-term reduction in water quality is allowable in areas given special protection as Outstanding National Resource Waters (48 Fed. Reg. 51402). Waters which potentially could qualify for ONRW designation are generally classified as “Tier III” waters.

Examples of such waters include, but are not limited to, waters of National and State Parks and wildlife refuges, waters of exceptional recreational or ecological significance, and state and federally designated wild and scenic rivers. To date, the only California water designated as an ONRW is Lake Tahoe. However, other California waters would certainly qualify.

ONRWs may be designated as part of adoption or amendment of water quality control plans. It is important to note that even if no formal designation has been made, lowering of water quality should not

be allowed for waters which, because of their exceptional recreational and/or ecological significance, should be given the special protection assigned to ONRWs.

Narrative and Numerical Objectives

The sections below provide additional direction on determining compliance with the narrative and numerical objectives of this Basin Plan.

Pollution and/or Nuisance

In determining compliance with narrative objectives which include the terms “pollution” and or “nuisance,” the Regional Board considers the following definitions from the Porter-Cologne Water Quality Control Act.

Pollution -- an alteration of the waters of the State by waste to the degree which unreasonably affects either of the following:

- such waters for beneficial uses.
- facilities which serve these beneficial uses.

“Pollution” may include “contamination.” Contamination means an impairment of the quality of the waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. Contamination includes any equivalent effect resulting from the disposal of waste, whether or not waters of the State are affected.

Nuisance -- Anything which meets all of the following requirements:

- Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
- Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.
- Occurs during or as a result of the treatment or disposal of wastes.

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References to Taste and Odor, Human Health and Toxicity (also see “acute toxicity” and “chronic toxicity,” below):

In determining compliance with objectives including references to Taste and Odor, Human Health or Toxicity, the Regional Board will consider as evidence relevant and scientifically valid water quality goals from sources such as drinking water standards from the California Department of Health Services (State “Action Levels”), the National Interim Drinking Water Standards, Proposition 65 Lawful Levels, National Ambient Water Quality Criteria (USEPA’s “Quality Criteria for Water” for the years 1986, 1976 and 1972; “Ambient Water Quality Criteria,” volumes 1980, 1984, 1986, 1987 and 1989), the National Academy of Sciences’ Suggested No-Adverse-Response Levels (SNARL), USEPA’s Health and Water Quality Advisories, as well as other relevant and scientifically valid evidence.

References to Agriculture or AGR designations:

In determining compliance with objectives including references to the AGR designated use, the Regional Board will refer to water quality goals and recommendations from sources such as the Food and Agriculture Organization of the United Nations, University of California Cooperative Extension, Committee of Experts, and McKee and Wolf’s “Water Quality Criteria” (1963).

References to “Natural High Quality Waters”:

The Regional Board generally considers “natural high quality water(s)” to be those waters with ambient water quality equal to, or better than, current drinking water standards. However, the Regional Board also recognizes that some waters with poor chemical quality may support important ecosystems (e.g., Mono Lake).

References to “10 percent significance level”:

A statistical hypothesis is a statement about a random variable’s probability distribution, and a decision-making procedure about such a statement is a hypothesis test. In testing a hypothesis concerning the value of a population mean, the null hypothesis is often used. The null hypothesis is that there is no difference between the population means (e.g., the mean value of a water quality parameter after the discharge is no different than before the discharge.) First a level of significance to be used in the test is specified, and then the regions of

acceptance and rejection for evaluating the obtained sample mean are determined.

At the **10 percent significance level**, assuming normal distribution, the acceptance region (where one would correctly accept the null hypothesis) is the interval which lies under 90 percent of the area of the standard normal curve. Thus, a level of **significance of 10 percent** signifies that when the population mean is correct as specified, the sample mean will fall in the areas of rejection only 10 percent of the time.

If the hypothesis is rejected when it should be accepted, a Type I error has been made. In choosing a **10 percent level of significance**, there are 10 chances in 100 that a Type I error was made, or the hypothesis was rejected when it should have been accepted (i.e., one is 90 percent *confident* that the right decision was made.)

The **10 percent significance level** is often incorrectly referred to as the 90 percent significance level. As explained above, the significance level of a test should be low, and the confidence level of a confidence interval should be high.

References to “Means” (e.g., annual mean, mean of monthly means), “Medians” and “90th percentile values”:

“Mean” is the arithmetic mean of all data. “Annual mean” is the arithmetic mean of all data collected in a one-year period. “Mean of monthly mean” is the arithmetic mean of 30-day averages (arithmetic means). The **median** is the value which half of the values of the population exceed and half do not. The **average value** is the arithmetic mean of all data. For a **90th percentile value**, only 10% of data exceed this value.

Compliance determinations shall be based on available analyses for the time interval associated with the discharge. If only one sample is collected during the time period associated with the water quality objective, (e.g., monthly mean), that sample shall serve to characterize the discharge for the entire interval. Compliance based upon multiple samples shall be determined through the application of appropriate statistical methods.

Standard Analytical Methods to Determine

5.1, Water Quality Standards

Compliance with Objectives

Analytical methods to be used are usually specified in the monitoring requirements of the waste discharge permits. Suitable analytical methods are:

- those specified in 40 CFR Part 136, and/or
- those methods determined by the Regional Board and approved by the USEPA to be equally or more sensitive than 40 CFR Part 136 methods and appropriate for the sample matrix, and/or
- where methods are not specified in 40 CFR Part 136, those methods determined by the Regional Board to be appropriate for the sample matrix

All analytical data shall be reported uncensored with method detection limits and either practical quantitation levels or limits of quantitation identified. Acceptance of data should be based on demonstrated laboratory performance.

For **bacterial analyses**, sample dilutions should be performed so the range of values extends from 2 to 16,000. The detection method used for each analysis shall be reported with the results of the analysis. Detection methods used for coliforms (total and fecal) shall be those presented in *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association et al. 1992), or any alternative method determined by the Regional Board to be appropriate.

For **acute toxicity**, compliance shall be determined by short-term toxicity tests on undiluted effluent using an established protocol (e.g., American Society for Testing and Materials [ASTM], American Public Health Association, USEPA, State Board).

For **chronic toxicity**, compliance shall be determined using the critical life stage (CLS) toxicity tests. At least three approved species shall be used to measure compliance with the toxicity objective. If possible, test species shall include a vertebrate, an invertebrate, and an aquatic plant. After an initial screening period, monitoring may be reduced to the most sensitive species. Dilution and control waters should be obtained from an unaffected area of the receiving waters. For rivers and streams, dilution water should be obtained immediately upstream of the discharge. Standard dilution water can be used if

the above sources exhibit toxicity greater than 1.0 Chronic Toxicity Units. All test results shall be reported to the Regional Board in accordance with the "Standardized Reporting Requirements for Monitoring Chronic Toxicity" (State Board Publication No. 93-2 WQ).

Application of Narrative and Numerical Water Quality Objectives to Wetlands

Although not developed specifically for wetlands, many surface water **narrative objectives** are generally applicable to most wetland types. However, the Regional Board recognizes, as with other types of surface waters such as saline or alkaline lakes, that natural water quality characteristics of some wetlands may not be within the range for which the narrative objectives were developed. The Regional Board will consider site-specific adjustments to the objectives for wetlands (bacteria, pH, hardness, salinity, temperature, or other parameters) as necessary on a case-by-case basis.

The **numerical criteria** to protect one or more beneficial uses of surface waters, where appropriate, may directly apply to wetlands. For example, wetlands which actually are, or which recharge, municipal water supplies should meet human health criteria. The USEPA numeric criteria for protection of freshwater aquatic life, as listed in *Quality Criteria for Water—1986*, although not developed specifically for wetlands, are generally applicable to most wetland types. As with other types of surface waters, such as saline or alkaline lakes, natural water quality characteristics of some wetlands may not be within the range for which the criteria were developed. Adjustments for pH, hardness, salinity, temperature, or other parameters may be necessary. The Regional Board will consider developing site-specific objectives for wetlands on a case-by-case basis.

Key to Table 5.1-1

"HU No." This column contains numbers used by the California Department of Water Resources in mapping surface water Hydrologic Units, Hydrologic Areas, and Hydrologic Subareas (watersheds and subwatersheds). See Plate 1A. The Lake Tahoe Basin is divided into three separate Hydrologic Areas, including the lake itself and "North Tahoe" and

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“South Tahoe” Hydrologic Areas including tributary waters.

“Hydrologic Unit/Subunit/Drainage Feature”

This column contains (in bold type) the names of watersheds and subwatersheds corresponding to the Hydrologic Unit numbers in the preceding column, and the names of surface waterbodies, including lakes, streams, and wetlands. Wetlands of the Lake Tahoe Basin were not delineated by the Regional Board's wetlands identification contractor to the same level of detail as those in other parts of the Lahontan Region such as the Owens River HU. Wetland names in this column are generally indicators of location rather than “official” geographic names. More precise information on wetland locations is available in the Regional Board's wetlands database.

“Waterbody Class Modifier” This column includes descriptive information on each waterbody in the preceding column (i.e., distinction between lakes, streams, and wetlands). The modifiers in the entries for “minor wetlands” indicate that such wetlands may include springs, seeps, emergent wetlands, and marshes. The term “emergent” refers to wetlands dominated by erect, rooted, herbaceous aquatic plants such as cattails, which extend above the water surface (Mitsch and Gosselink 1986). Marshes are one type of emergent wetland.

“Beneficial Uses” The subheadings under this heading are abbreviations of beneficial use names which are defined in the text of Section 5.1. An “x” in a column beneath one of these subheadings designates an existing or potential beneficial use for a given waterbody.

“Receiving Water” This column names the waterbody to which a “drainage feature” named at the far left side of the table is tributary.